

# NATURE OF TIME

(According to “Hypothesis on MATTER”)

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*Abstract:* Time is a functional entity, derived from the fundamental property of basic 3D matter particles (photons) to move at a constant linear speed. 3D matter has no ability to act or move. It is the all-encompassing universal medium around the 3D matter particle, which moves them at the highest possible speed. Unit of time is related to the interval required by a photon to traverse definite extent of universal medium in space. Relating other activities, about 3D matter bodies, to time help us to rationalise in terms of cause and effect relations. Due to its lack of physical form, time can neither expand nor contract nor flow in any direction.

*Keywords:* Time, disturbance, photon, 3D matter, quantum of matter, 2D energy field.

## Introduction:

“Hypothesis on MATTER” describes an alternative concept. This concept is based on only one type of postulated matter particles – the quanta of matter. Quanta of matter are 1D matter particles and they form 2D latticework structure, called 2D energy field, in all possible planes in space and create a universal medium. Quanta of matter fill the entire space. 2D energy fields, inherently, tend to maintain their homogeneity and serenity. During a local breakdown that produces a gap in their latticework structures, 2D energy fields tend to move towards the gap to fill the gap and restore their serenity. If an entity is present in the gap, actions by the 2D energy fields apply inward pressure on them. This inward motion by the 2D energy fields is gravitational action. Local breakdown of the 2D energy fields may release many quanta of matter from their latticework structures, to be free in space. Gravitational actions, by surrounding 2D energy fields, gather these free quanta of matter to produce ‘disturbances’. Depending on the size of a disturbance, gravitational action may compress quanta of matter in the disturbance into their 3D status to create 3D matter. Due to their tendency to attain serenity, the 2D energy fields expel the 3D matter created in them. Since, 2D energy fields are everywhere, this expulsion continues as long as the 3D matter particle

is in existence. Linear speed of the 3D matter particle, due to the expulsion from 2D energy field, is the highest possible speed that can be achieved without further damaging the 2D energy fields. 2D energy fields around the ejected 3D matter particle maintain sufficient distortions in them to sustain the particle's linear speed by inertial actions. Ejected matter particle and the 2D energy fields-distortions surrounding it, together, constitute a photon (corpuscle of light). Direct actions by the 2D energy fields on the 3D matter core of the photons, in this concept, do away with the illogical assumption of actions at a distance.

Depending on the nature of the 2D energy fields in any region of space, highest possible linear speed of a photon is constant and this makes the speed of light a critical constant. Core body of all photons are disc shaped (spherical-segmented) and of same radial sizes. Each photon spins about one of its diameters at an angular speed proportional to its matter content. An attempt to reduce photon's linear speed reduces its matter content (frequency), instead of reducing its linear speed. An attempt to increase photon's linear speed increases its matter content (frequency), rather than increasing its linear speed. This keeps the linear speed of a photon constant with respect to surrounding 2D energy fields.

Compatible photons join as binary unions to form elementary particles. The elementary particles, in turn, form fundamental particles, atoms and other macro bodies, found in nature. All conclusions expressed in this article are taken from the "*Hypothesis on MATTER*" [1]. For details, kindly refer to the same.

## **Fundamental measurements:**

Matter and its (apparent) interactions dominate our world. Matter provides a sense of reality to nature and our existence. In order to understand the matter bodies and their (apparent) interactions, as rational beings, we need to relate one matter body to others and relate a matter body in one state to the same body in a different state. This can only be done by comparison between different bodies or the same body in different states. For this reason, the dimensional measurements are formulated. To define a dimensional measurement, we need to have a reference. Nearer to an absolute measurement a reference is, better is the accuracy of the dimensional measurement system defined.

A matter particle (or a matter body) has only two types of basic dimensional measurements. One type of measurement is of its matter (substance) content. Since we have no reference for this (to compare with), we are unable to formulate a dimensional measurement system for the direct measurement of matter content of a body. Instead, we are compelled to represent the matter content of a body by using indirect means, related to known or derived references from other dimensional measurement systems. Thus, we do not have fundamental measurements, to directly describe the matter content of a body.

Second type of dimensional measurement of matter bodies is the relation between different matter bodies or between different parts of the same body in space, represented by the distance or the separation between them. In order to formulate a dimensional measurement system for this relation, we presume to have a reference. It is generally understood that the displacement (speed) of light in space keeps (almost) a constant speed. In order to make this as a reference, useful to define the distance, we introduced a functional entity – time – to represent equal intervals of changes in physical properties of certain matter bodies. We can measure the distance traveled by light in a unit interval of certain physical changes (unit time). This distance, which is believed to be a constant, is used by us to define or relate our measurements of distance in space. Any other reference, which will provide similar or better convenience, may also be used to define the distance. Distance is the relation between locations of matter bodies (or one part of a body to another) in space.

## **Motion:**

One of the most fundamental properties of a photon is its motion at constant linear velocity (since the spin speed or the frequency of a photon is directly related to its matter content, we will not consider photon's spin motion in this article). In fact, a photon's matter body exists in its stable state only because of its motion at a constant linear velocity. By its inherent property, a stable photon maintains its velocity at a critical constant value. Velocity of a photon is with respect to the 2D energy fields (universal medium) around it. Inertial property of 2D energy fields in the region, where the photon is present at the instant, move the photon at its critical constant velocity. It is a necessity of the 2D energy fields to maintain the velocity of a photon at the critical level. Hence, the 2D energy fields put-in continuous effort to sustain the linear velocity of the photon at a constant level. Although, here the motions are directly assigned to the

photon, a photon (being a matter particle) is incapable of any actions or movements on its own. It is the inertial actions of the 2D energy fields about a photon, which move the photon.

Interactions between a photon's matter body, in its unstable condition, and the 2D energy fields around it produce the photon's linear motion. Once a photon has attained stability, this interaction is not present at the same scale any more. Photon's matter body is carried forward only by the inertial actions of the 2D energy fields, which are limited to the immediate surrounding of photon's matter body. Interactions between a photon, in its unstable condition, and the 2D energy fields are the result of the inherent tendency of the 2D energy fields to remain homogeneous and isotropic. The 2D energy fields cause ejection of a disturbance out of themselves. They mould a disturbance into a 3D matter body of appropriate shape and move it at constant linear velocity to transform it into a photon. By doing so, the 2D energy fields on a larger scale, regain their serenity.

No 3D matter body (photon) has continuous existence in any one 2D energy field. It will be continuously ejected out of the 2D energy fields of its existence, at any instant. Since the 2D energy fields are everywhere, 3D matter bodies of the photons can never escape this ejection force. In nature (in our 3D world), all real matter is in the form of photons. There are no basic 3D matter particles larger or smaller than photons. Photons vary in their matter contents, as indicated by their frequency. Radial size of all photons are similar. Photons, in various combinations, make up all other particles and bodies we observe in nature.

Motion of a body is necessarily accompanied by its displacement in space. In 3D space system, magnitude of displacement is measured with respect to three mutually perpendicular co-ordinate planes. To comprehend the displacement of a body, it is necessary to compare the location of a body at any instant, with a reference outside the body. Since the same 3D matter body cannot exist simultaneously in two places, there should be an interval between the existence of the 3D matter body in one place and its presence in another place, after its displacement. The body can be in the second location, only after being at the first location. When other changes in a 3D matter body are considered, the interval is between two states of the body. A body cannot be in two identical states simultaneously. One state has to precede and another state has to follow. Likewise, all actions have their causes preceding them. Interval between two states of a body produces the rationality in the continuous existence of the body. Cause and effect relation of all physical phenomena necessitates sequential operations. Hence, there is an interval (however small it may be) between two states or two phenomena of matter bodies. This interval is required for the cause to produce the effect or for the first phenomenon to produce the second phenomenon, which depends on the result of first phenomenon. Unless the first phenomenon produces certain result, the second phenomenon cannot take place.

These phenomena are real. There is nothing else between them. Interval, in between the phenomena, is only a functional entity. It has no real existence. Gap between the phenomena is understood by rational beings, who observe many other actions being taking place in the outside world, as an interval. If the first phenomenon culminates in a particular result, the second phenomenon has to follow the first. Interval between them does not affect the nature of the first or the second phenomenon. On the contrary, it is the interval, which depends on the development of the second phenomenon after completion of first phenomenon. That is, unless the second phenomenon has developed (however late or far it may be) we do not recognize the interval. Interval comes into existence only when the second phenomenon has developed after the first phenomenon. Hence, the interval has absolutely no control over either of the phenomena or their results.

Interval between two phenomena depends on (or it is controlled by) the relation between these two phenomena. That is, if the interval is larger for the first phenomenon to produce a particular result to commence the second phenomenon, the first phenomenon can be considered to operate for longer interval (or if the second phenomenon takes place, a long time after the first phenomenon, the interval between them may be considered longer). Physical phenomena develop and control the interval between them. Physical phenomena are the apparent interactions between matter bodies in all their related forms. Real interactions take place between each of the matter bodies and the 2D energy fields, separately. Interval between two phenomena has no control over either of the phenomena.

## Time:

To represent this interval between two phenomena, a functional entity called ‘time’ is used. Time has no real existence. Time is a functional entity and hence it has no tangible existence and no direction. It is purely a scalar measurement. It is created by the rational beings to understand the cause and effect relations between different states of a body. In order to have a reference for a (macro) body’s motions, they are related to the linear motions of a stable photon (in free space). What is being considered is the (rate of) number of 2D energy fields traversed by a stable photon at its critical state of linear motion during equal intervals. Therefore, the time is the interval elapsed for a stable photon’s displacement in the 2D energy fields from one reference point to another reference point, with definite number of 2D energy field latticework squares in between them.

Because of its functional property, time cannot be considered as a fundamental dimension in any dimensional space system. It comes into existence only when there is motion and because of the motion. It qualifies an action or a change of state. It does not describe (distance in) space or matter content. As soon as the first 3D matter particle was created, due to its inherent nature of motion, a functional property of time also came into existence for rational beings like us. Time has no tangible existence. Scale and measurement of the time is always related to motion or change of state of matter bodies. Hence, the time should be considered as a character of matter rather than a dimension of space. In some mathematical (analytical) solutions, time is also used with other fundamental dimensions to describe (history of) events in space. This has led to an erroneous belief that the time is a fundamental dimension. Thus, the time has come to be regarded by many, as the fourth dimension (of space).

Whichever method we use to estimate the time and its units of measurement, we are basically, comparing the motion of a photon in the 2D energy fields and the motion of another (macro) body in 3D space. Second, the unit of time is presently defined as “*duration of (certain) number of periods of the radiation corresponding to the transition between the two hyper fine energy levels in the ground state of caesium-133 atom*”. This refers to the frequency of photons radiated under the defined conditions. In order to produce photons of this particular frequency, constituent photons of the atom have to discard quanta of matter at certain rate, into the 2D energy fields. This, in turn, depends on the speed variations of constituent photons of the atom. In other words, frequency of the photons, radiated by cesium-133 atom under the defined conditions, depends directly on the movement and the variations in the speed of constituent photons of the atom. Steady frequency of radiated photon indicates steady speed variations of atom’s constituent photons.

Stable photons, in space, move in linear directions. However, when the photons (in their unstable state) are forming elementary particles and higher forms of matter bodies, they move at constant critical linear speed in circular paths within the particles, formed by them. Normally, larger particles or macro bodies (made up of unstable photons) may move as required by the external forces, without affecting the independent motions of their constituent photons. It is this motion of a macro body, as a whole body, which is compared with the linear motion of a stable photon in free space.

Human beings (and up to an extent, many other living beings) have an ability to think and deduce rationally. To develop this rationality, they are trained throughout their life to think in terms of cause and effect. Every effect has to have a preceding cause or an action follows a cause. This sequential rationalization creates a sense of past, present and future in all our thinking. This has created an apparent direction and an arrow of time for us. Our training is so thorough, that we refuse to consider anything else, which does not exhibit this sequential relation (e.g. instincts) as reasonable or rational. In our rational thinking, the time appears to be very real that we have no hesitation to call the time, a real entity and a fundamental dimension.

## Variation in the scale of time:

Time is a convenience created for us and by us to understand interactions between matter bodies or states of matter bodies, rationally. In our sense, the functional dimension of time came into being when the first photon was created (if there was such an action) in nature. Time will continue to be in existence as long as there are 3D matter (photons) and rational-thinking beings like us exist in the nature. Time will cease to be in existence when there is a lack of any of these two. Since the time depends on the existence of photons and the existence of rational beings, either of them can control scale of measurement of the time.

Variation in the velocity of a photon in relation to the reference points in the 3D world or the thinking of rational beings can control or regulate the flow of time. Therefore, it is up to us, the rational beings, to assign meanings to the 'time'. Time will fulfill functions assigned to it. The time, being only a functional entity, it has no physical form. An entity without physical form cannot contract, expand, flow or deform in any other way.

We may say that a photon – radiation of matter – always maintains its linear velocity (this can be in linear or curved paths) at a constant critical value with respect to the 2D energy fields. Actually, it is the 2D energy fields, which are forcing a photon to move at the maximum possible velocity with respect to itself. Just because this velocity is the maximum, the 2D energy fields can produce, it happens to be a critical constant under steady conditions. If conditions of the 2D energy fields in a region vary, the criticality of the maximum velocity also will vary. For a different state of the 2D energy fields, in another region of space, the magnitude of the constant velocity of a photon (the light) with respect to other 3D bodies will be different.

### **Relative time:**

Units of distance-measurements in any dimensional space system are based on the motion or linear speed of photons. Therefore, a change in the linear speed of photon changes the units of distance also, in that dimensional space system. In the same region of space, corresponding changes in the photon's linear speed and the scale of distance keep the unit of time, a constant. Based on this constancy of linear velocity of light (stable photon) in a region of space, where we live, we can set our standard of time. Interval required for the photon to move through a definite quantity (space occupied by the functional thickness of 2D energy fields) of quanta of matter in the 2D energy fields is set as a standard unit of time. While doing so, we did not consider any of our aspects as the observers or the state of our surroundings. Instead, it is assumed that the observer and his surroundings are static with respect to the 2D energy fields. 2D energy fields are fluid in nature. Depending on the macro bodies, present in the region, their density may vary from place to place and the motion of a photon is related to these variable densities of 2D energy fields. Therefore, to assess the absolute velocity of a photon – radiation of matter – the state of observer and his surroundings with respect to the 2D energy fields also should be taken into consideration. An estimate of the velocity of radiation (light), without considering these factors, is only of apparent or relative value. Observers, under different states of motion, each have their own estimate of relative time. To estimate the absolute time: motion of the photon, motion of the observer, movements of the (distortions in the) surrounding 2D energy fields and the state of surrounding 2D energy fields are to be taken in to consideration.

To estimate the relative time, linear motion of a stable photon is considered with respect to the observer. Depending on the motion of observer and the state of the 2D energy fields, linear velocity of radiation appears to be faster or slower than the estimated relative velocity, but never faster than the absolute linear velocity of radiation. Since the velocity is a relation between the displacement and time, we can take either the unit of displacement or the unit of time to be a constant and let the other vary. In some cases (like transmission of light through a denser medium of a transparent macro body), we take the unit of time as constant and let the unit of displacement vary. Thus, we find that the light travels slower in a denser medium of transparent macro body. However, in some other cases (like when comparing very large velocities or passages of light near a very massive macro body), we take the unit of displacement as constant and let the unit of time as a variable. Thus, we see that the time moves faster or slower for the observers in motion or near massive bodies. It appears that the general rule, followed at present, is that: if the observer is outside the transparent medium, velocity of radiation is variable within the medium and the unit of time is considered a constant. If the observer is inside the transparent medium, the velocity of radiation is a constant within the medium and the unit of time is considered variable. This is not a scientific thinking.

In every day life, we consider the unit (or rate of flow) of time as a constant so that the light appears to be traveling slower in a denser transparent medium and faster in a rarer transparent medium. Whatever is the case, velocity of light with respect to the 2D energy fields never varies. If the 2D energy fields in a region can be made very dense, the velocity of light in it will appear to be very slow to an outside observer, may be even few kilometres per second and thereby creating an illusion that the time almost stands still.

For another observer, witnessing the same action from another region of 2D energy fields of different density, time flows at a different rate.

### **Arrow of time:**

Time is always estimated in relation to the displacement of some or the other matter body or particle. Therefore, the time itself is no real quantity but it is only a functional quantity to indicate a relation. It describes a function or a relation between certain action with respect to an action of a reference body or particle. Hence, it is not correct to assign a direction to the time. However, due to sequential actions of cause and effect, we (the rational beings) feel that the time flows in one direction, from the past through the present to the future. This gives us the false impression of direction of time and corresponding arrow of time in the direction of future. Arrow of time may be compared with arrows of other emotions. When one person loves another, the arrow of love is directed from the first person to the second person.

### **Conclusion:**

Time is a functional entity, conceived by us to help us to relate different phenomena. Since the time does not describe space and it is not tangible, time should not be included with fundamental dimensions as one of them. When, we are supposed to measure time, we are actually measuring a regular motion or some other similar physical activity of some matter bodies and assigning certain meaning to such motions in terms of 'time'. Since the time has no physical form, it cannot contract, expand or flow in any direction. Time is included with the fundamental dimensions to define the character or history of certain events, in some theoretical approaches, only for the ease of analytical solutions of mathematical equations. This does not mean that time has become or is regarded as a fundamental dimension, as many happens to think.

### **Reference:**

- [1] Nainan K. Varghese, *Hypothesis on MATTER* (second edition), (2008).  
<http://www.booksurge.com/Hypothesis-on-MATTER-Second-Edition/A/1419689789.htm>
- [2] Nainan. K. Varghese, ARTICLES, <http://wbabin.net/papers.htm#Varghese>

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